

the omentum was still irreducible. Before anaesthesia was complete it was found that there was a distinct and tender rounded swelling in the lower part of the hernia, just above the testicle, which could be felt to contain two or three hard tender masses of different size.

An incision was made over the swelling and extending up on to the abdomen, and the upper loculus of the sac (c in figure) opened. The contents within it were normal omentum, more of which could be easily withdrawn from the abdomen through the neck (B), which was not strangulating the omentum. Though it was possible to withdraw omentum from the abdomen through the neck B, it was impossible to withdraw it through the neck D from the loculus E. In consequence the incision in the sac had to be enlarged with scissors and the neck D divided. On withdrawing the omentum from the loculus E, it was seen to be smooth, swollen, not adherent, and twisted once on itself, untwisting as it was released. Interlocking ligatures were placed on the stalk of the omentum which had been in the neck B, and the distal part removed. The sac was then freed, divided, and the proximal end closed. The inguinal canal was sutured with silk after the manner ascribed to Ferguson. The skin wound was closed with silkworm gut. The wound healed by first intention; later on an abscess containing fat globules discharged from the depths of the wound, and a mass could be felt in the abdomen, which was probably the inflamed end of the ligatured omentum, epiploitis.

A few years ago we operated on a somewhat similar case of painful irreducible epiplocele, but at the operation observed no torsion. It is of interest that the authors should have some difference of opinion as to the presence or absence of torsion at the point B in the illustration. There is no doubt about that at D. But this shows how easy it is to miss or be uncertain about the smaller degrees of torsion.

Dr. A. B. Howitt and one of us have recently published two elaborate papers² upon the subject of the reduction *en masse* of herniae. Amongst other things, we urged that if by reduction *en masse* was meant the reduction of the hernia with its sac, its occurrence, partial or complete, was frequent enough in the habitual reduction by the patient of omentum, large bowel, and other herniae. The hernia recorded in the present communication had been only partially reducible for seven years. It had been seen when partially reduced, and it could be ascertained that the loculus E alone was completely irreducible. True, it took some time to reduce loculus C. But it could be done. Reference to the figure shows that the portion B—D was reducible *en masse*, sac and all. Therefore we would urge that the loculus E was probably the original sac of the hernia, that D was its neck, and that the loculus C and its neck B were acquired later. A proposition which might shed clinical light upon the suggestion that all herniae have preformed sacs.

REFERENCES.

¹ *American Journal of Medical Science*, 1905, cxxx, pp. 314-329; *St. Thomas's Hospital Reports*, 1904, xxxiii, pp. 435-475; *Medical and Chirurgical Transactions*, 1905, lxxxviii; *Transactions of the Clinical Society*, 1905, xxix, pp. 21-25. ² *Annals of Surgery*, April, 1908, pp. 573-587; *St. Thomas's Hospital Reports*, xxxv, 1906, pp. 439-458.

By way of marking the completion of the improvements at the Seamen's Hospital, Greenwich, its chairman and committee were "At home" on October 28th. The improvements have been of the sanitary arrangements and minor structural alterations calculated to facilitate the efficiency and ease with which the work of the institution is performed. Towards the cost King Edward's Hospital Fund for London subscribed £2,000.

CANCER IN TRAVANCORE, SOUTH INDIA.*

A SUMMARY OF 1,700 CASES.

BY WILLIAM C. BENTALL, L.R.C.P. AND S.E.,

SURGEON TO THE FIFTEEN HOSPITALS OF THE SOUTH TRAVANCORE MEDICAL MISSION OF THE LONDON MISSIONARY SOCIETY.

WHEN I first came to Travancore six years ago I was struck with the fact that nearly every second person I met had a tumour the size of a plum in the one cheek or the other, but on closer acquaintance with the people I found this to be a removable quantity, and I well remember making bold to ask a man what that swelling was, and he, taking it as a rebuke, retired to the edge of the verandah and ejected the quid of betel! But I have since found that, erroneous though my first judgement was, there is a close connexion between the pseudo-tumour and the malignant, and for a few years I have felt that the great frequency of cancer, especially of the buccal cavity, arising, apparently from definite secondary causes, should be an indication for the line of investigation for primary causes. Feeling this, I wrote to Dr. Bashford, of the Imperial Cancer Research Fund, for suggestions as to lines of investigation and record, and in the report he sent me I was surprised to find that in the India Table for 1905 only 5 cases of cancer of the buccal mucous membrane were recorded, and of upper jaw 5 only, and lower jaw 31. My own report for that year for our Central Hospital at Neyoor showed 28 cases of buccal mucous membrane cancer.

I have gathered up from our fifteen mission hospitals (under the auspices of the London Missionary Society) and also from thirty-four Government hospitals, by the kind help of the Acting Durbar Physician, Dr. H. Campbell Perkins, the malignant cases seen during the last five years, numbering in all 1,700.

Geographical Incidence.

In the extreme north, in Cashmere, Dr. Neve, in charge of the Church Missionary Society Hospital, reports 100 cancer cases amongst 20,000 new cases annually, that is, 0.5 per cent. At Miraj, in the Bombay Presidency, Dr. Wanless, of the American Presbyterian Hospital, reports 41 cancer cases out of 13,666 new cases annually, a percentage of 0.3; and at Jumalamadagu, in the Cuddapah District, Drs. Campbell and Thomson, in charge of the London Mission Hospital, give 54 cancer cases in 6,870, which is just below 1 per cent. In South Travancore, out of 385,833 new cases in our own hospitals in five years, I find 702 cases of malignancy, which gives a percentage of a little below 0.2 per cent. as the cancer incidence. But in our central hospital at Neyoor it works out to nearly 1 per cent., which, perhaps, is due to a certain notoriety we have attained for operating on such things. I notice also in the returns kindly supplied to me by Dr. Campbell Perkins that the hospitals on the hills amongst the planters' coolies show a very much lower cancer-rate than those on the plains. In India, of course, we cannot satisfactorily tabulate death-rates from cancer, so as to enable us to compare with those of Britain, but the above figures may make a basis of comparison.

Age and Sex Incidence.

The most striking feature in Table I is the fact that the age of maximum occurrence of cancer in Travancore is about 20 years younger than in Great Britain—a difference most prominently marked in females in Travancore, where the highest figure is reached between the ages of 36 and 45. I do not think that this suggests that the menopause occurs younger in Travancore, for although I have not tabular figures at hand, I have gathered the distinct impression in my work that the menopause here comes on rather later, between 45 and 50.

To make the comparisons more striking I have constructed a percentage table (Table II) for Travancore and English age-incidence, the former based on my 1,700 cases, the latter on the report of the Imperial Cancer Research Fund for 1905.

* A paper read before the South Indian and Madras Branch of the British Medical Association at Madras, October 25th, 1907.

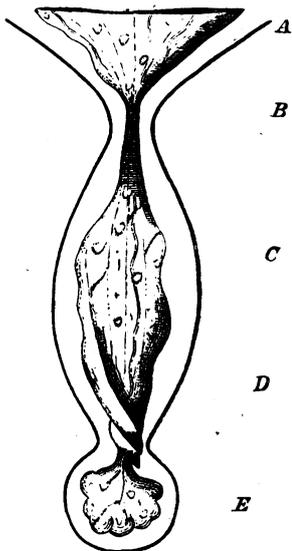


Diagram of the hernia sac. A is the abdominal end of the sac through which the omentum is entering. B is the neck of the sac where the omentum has become thinned and stalk-like, on which the ligatures were placed. C is the upper loculus which was opened first at the operation. D is the constriction in the sac separating the upper loculus, C, from the lower loculus, E, which contained the twisted omentum. It is probable that D is the point to which the hernia sac was reducible *en masse*, E being irreducible.

TABLE I.—Age Incidence of Cancer in Travancore in 1,700 Cases.

| Age. | Males. | Females. | Total. |
|----------------|--------|----------|--------|
| Under 9 | 2 | 5 | 7 |
| 10-15 | 10 | 5 | 15 |
| 16-25 | 27 | 20 | 47 |
| 26-35 | 133 | 95 | 228 |
| 36-45 | 294 | 226 | 520 |
| 46-55 | 317 | 189 | 506 |
| 56-65 | 141 | 130 | 271 |
| 66-75 | 52 | 42 | 94 |
| Over 75 | 5 | 7 | 12 |
| Total | 981 | 719 | 1,700 |

TABLE II.—Comparative Percentage Age Incidence of Cancer in Travancore and Britain.

| Age. | Travancore. | | | England and Wales.* | | |
|-----------------|-------------|----------|--------|---------------------|----------|--------|
| | Males. | Females. | Total. | Males. | Females. | Total. |
| Under 25 | 4 | 4.2 | 4.1 | 2.1 | 1.2 | 1.6 |
| 26-35 | 13.5 | 13.3 | 13.4 | 2.2 | 3 | 2.6 |
| 36-45 | 30 | 31.5 | 30.7 | 7.2 | 11.1 | 9.2 |
| 46-55 | 32.3 | 26.3 | 29.4 | 19 | 22 | 20.5 |
| 56-65 | 14.4 | 18.1 | 16.2 | 30.5 | 28.4 | 29.5 |
| 66-75 | 5.3 | 5.7 | 5.5 | 27.2 | 22.5 | 24.8 |
| Over 75 | 0.5 | 0.9 | 0.7 | 11.8 | 11.8 | 11.8 |
| Total | 100 | 100 | 100 | 100 | 100 | 100 |

* The English figures are calculated from Tables VIII and IX of the Report of the Imperial Cancer Research Fund for 1905.

This shows clearly that whereas in England the highest cancer-rate is between the ages of 56 and 65, in Travancore it is between 36 and 45. Between 56 and 65 in England the percentage is 29.5, while in Travancore at that age it is only 16.2. Again, at Travancore's maximum incidence age of 36 to 45, where the percentage is 30.7, the English figure is as low as 9.2. Six months of this difference may be accounted for by the fact that the English figures are death-rates while mine are living cases, but I do not think that this accounts for the variation. Then, again, there is a marked drop in Travancore cases after the age of 65, at which age Travancore shows only 5.5 per cent. as against England's 24.8, while after 75 Travancore has only 0.5, while England gives 24.8. This surely is suggestive that the Travancore cases have died off, which does away with the possible reasoning that the great difference at maximum incidence ages is due to my figures being living ones against the death-rate of the English figures. But at the other end of life there is the same contrast. Under 25 the Travancore cancer incidence is 4.1, while the English rate is only 1.6, and from 26 to 35 it is more striking still—13.4 as against 2.6. Both sexes, with very slight variation, present these general contrasts.

Surely so striking a difference is at least suggestive of some causative factor occurring earlier in life in Travancore. True it is that the Indian as a rule lives a shorter life than the Englishman, but the difference is hardly twenty years; and, further, if that argument be advanced to explain the great difference at middle and later life, it cannot be adduced as an explanation for the difference below 25.

Site and Sex Incidence.

The point which at once attracts attention in Tables III and IV is the overwhelming predominance of cancer of the buccal mucous membrane in both sexes, forming 34.9 per cent. of all cases seen; or, if taken with cancer of the lips,

TABLE III.—Site Incidence of Cancer in Travancore in 1,700 Cases.

| Site of Cancer. | Males. | Females. | Total. |
|-------------------------------|--------|----------|--------|
| Lip | 111 | 58 | 169 |
| Tongue | 95 | 63 | 168 |
| Buccal mucous membrane | 420 | 231 | 652 |
| Oesophagus | 5 | 3 | 8 |
| Stomach | 2 | 1 | 3 |
| Rectum | 2 | 2 | 4 |
| Liver | 1 | 2 | 3 |
| Penis | 43 | — | 43 |
| Breast | 1 | 54 | 55 |
| Jaw (upper and lower) | 156 | 70 | 226 |
| Parotid gland | 2 | — | 2 |
| Sacrum | 4 | — | 4 |
| Skull | 1 | — | 1 |
| Scapula | 1 | — | 1 |
| Arm | 6 | 1 | 7 |
| Leg | 6 | 7 | 13 |
| Intestines | 2 | 5 | 7 |
| Uterus | — | 126 | 126 |
| Site not stated | 118 | 100 | 218 |
| Total | 960 | 718 | 1,700 |

TABLE IV.—Comparative Percentage Site Incidence of Cancer in Travancore and Britain.

| Site of Cancer. | Travancore. | | | England and Wales.* | | |
|-------------------------------|-------------|----------|--------|---------------------|----------|--------|
| | Males. | Females. | Total. | Males. | Females. | Total. |
| Lip | 11.5 | 8 | 9.9 | 1.3 | 0.9 | 1.1 |
| Tongue | 9.8 | 9 | 9.4 | 5.4 | 0.4 | 2.9 |
| Buccal mucous membrane | 43.7 | 32 | 37.8 | 1.9 | 0.2 | 1 |
| Oesophagus | 0.5 | 0.4 | 0.4 | 6.2 | 1.4 | 3.8 |
| Stomach | 0.2 | 0.1 | 0.1 | 22 | 14 | 18 |
| Rectum | 0.2 | 0.3 | 0.2 | 10.2 | 5.8 | 8 |
| Liver | 0.1 | 0.3 | 0.2 | 13.6 | 13.7 | 13.6 |
| Penis | 4.4 | — | 2.2 | 1.4 | — | 0.7 |
| Breast | — | 7.5 | 3.7 | — | 16.5 | 8.2 |
| Jaw (upper and lower) | 16.2 | 9.7 | 13.3 | 3 | 0.7 | 1.8 |
| Parotid gland | 0.2 | — | 0.1 | 0.3 | 0.1 | 0.2 |
| Sacrum | 0.4 | — | 0.2 | 0.2 | 0.1 | 0.15 |
| Skull | 0.1 | — | 0.05 | 0.1 | 0.04 | 0.7 |
| Arm | 0.6 | 0.1 | 0.3 | 1.4 | 0.9 | 1.1 |
| Leg | 0.6 | 0.9 | 0.7 | | | |
| Intestines | 0.1 | 0.7 | 0.4 | 7 | 6.5 | 6.8 |
| Peritoneum | — | 0.1 | 0.05 | 0.9 | 1.6 | 1.2 |
| Uterus | — | 17.3 | 8.7 | — | 23.1 | 11.5 |
| Site not stated | 12.3 | 14 | 13.1 | 1.3 | 1.2 | 1.2 |

* The English figures are calculated from Tables VIII and IX of the Report of the Imperial Cancer Research Fund for 1905.

tongue, and jaws, they form the large percentage of 70.6 of the whole series. Now in English malignant growths the rate is only 0.9 per cent. for buccal mucous membrane, and in females alone 0.2 per cent.; and including lips, tongue, and jaws, 5.8 per cent., a sufficiently striking difference to suggest a local cause. A word of explanation is necessary concerning the figures relative to the female genital organs. As is well known, of course, the Indian female, fettered with "Purdah" laws and customs, is less

likely than even the Western female to seek medical advice on these matters, and hence probably figures are fallacious; moreover, half of my figures for uterine and mammary cancer are from two women's hospitals alone. Hence I feel that comparison here would be of little value.

The low rate of malignancy of the stomach (1 per cent.) is remarkable also. English figures give 14 per cent. for females, and 22 per cent. for males. A similar contrast is noticeable in the figures for liver and gall bladder.

I admit, as far as my own work is concerned, that the less careful diagnosis in the rush of Indian work, as compared with the definite *post-mortem* results and more elaborate methods of examination in England, will account for some of this striking difference, but not, I think, for all. The absence of vomiting of blood, or the so-called coffee-grounds, and of melaena, is a striking feature in out-patient work in Travancore, in the presence of so much that is definitely dyspeptic trouble. I have records of medical itineracy work, showing just over 3,000 cases, when I myself saw every case; there were only 2 cases of vomited blood and 1 of coffee-ground vomit which were definite. In about 50,000 passed through our head hospital I have only seen 2 definite cases of vomiting of pure blood suggestive of gastric ulcer (neither a serious case) and 3 of the coffee-ground type.

The striking point is that while cancer of the mouth and jaws is exceedingly prevalent in Travancore, far exceeding its prevalence in England, with cancer of the rest of the alimentary canal it is just the opposite.

Summary of 380 Cases under Personal Supervision.

These cases were seen at our central hospital at Neyoor during the years 1903 to 1907, some of the earlier in conjunction with my former colleague, Dr. Fells of Bristol, who has published¹ details of 72 lower jaw excisions done here, and some of the later with my present colleague, Dr. Davidson. Of these I operated on 190 cases, which consisted of the following:

Seventy-five Buccal Mucous Membrane with Involvement of the Cheek.—Microscopical sections were made from 25 of these; 8 showed typical cell nests, 11 club-shaped in-dippings of the epithelial cells, and about 6 I could not be certain. The clinical characteristics of all were alike.

Twenty-three of the Buccal Mucous Membrane with no external involvement of the cheek; 4 gave cell nests, and 7 were otherwise diagnostic on section. (See below.)

Of the 14 Lip Cases, 1 also showed an involvement of the upper lip just opposite the growth on the lower lip; and since reading Mr. Butlin's address on surgery at the Annual Meeting of the British Medical Association at Exeter, on "Autoinoculation,"² I have wondered if it would have made a pair to the solitary case he quotes of von Bergmann? Unfortunately it was one of the cases not sectioned. The distribution of cancer on the lower lip, as described so fully by Mr. Cheadle in recent numbers of the *Practitioner*, I have frequently seen, and his suggested lines of excision I have found most valuable in dealing with these cases.

Twenty-six Half Lower Jaw Excisions.—Only 3 were sarcomatous. For the lower jaw I never do tracheotomy, and by freeing the internal pterygoid, masseter, and temporal before opening into the mouth, sawing through the symphysis, and finally turning the head to the side, and running along the mucous membrane with the scissors, practically no blood gets down the throat at all. I have never lost a case.

Upper Jaws number 12; 5 were sarcomatous; in only 2 did I remove the orbital plate, and in 1 I had to remove both pterygoid plates of the sphenoid to get clear of the growth.

Eighteen Tongues were operated on, 5 being only partial; 5 were half-tongue removals, and 8 were complete excisions. Whitehead's operation plus the splitting of the cheek was the method always adopted; in 2 cases tracheotomy was done at the time. In the later cases of this series the complete clearance of the glands along the carotid sheath from jaw to sternum, together with the submaxillary triangle, as recommended by Butlin in the *BRITISH MEDICAL JOURNAL*, February 11th, 1906, has been done a week before the tongue removal, and in two of these cases the lingual artery was tied; but I never had any difficulty with the linguals at the operation, save in one case where there was reactionary haemorrhage, and we found the patient in a pool of blood three hours after the operation; two hours with the finger hooked over the root of the tongue, and adrenalin with salines pulled him round. All of these tongue cases showed the growth on the side, and 7, on microscopical examination, showed typical squamous epithelioma; in one case, in removing half the tongue, I came on a hard, round lump like a marble far back, right in the middle line; it came out clean, and section showed it to be a gumma, while the marginal growth showed cell nests.

Six Cases of Penile Cancer.—Two were removed completely, the corpora cavernosa being removed by raspatories from the

ischio-pubic rami; neither have recurred (two years after), while all amputated cases did recur.

Encephaloid Cancer of the Tibia.—Three cases, presenting exactly the same appearances and in the same site. Microscopic sections of all three were examined. The first case, after two removals and recurrence, I amputated; in a second case I failed to get permission to amputate, and so tried to chisel out a wedge in the affected area, but I heard that the patient died some weeks afterwards. A sarcoma of the femur, one of the scapula where the whole pectoral girdle was removed, and one of the right forearm, complete the bony growths.

Of Abdominal Malignancy we see but little; one case of pyloric growth in which I did a posterior gastro-jejunostomy died in three days. A case of multiple colloid cancer of the abdomen we mistook for an ovarian cyst. The patient was hardly under chloroform when she ceased breathing, artificial respiration was done, and the abdomen opened quickly to relieve pressure, and out gushed great lumps of gelatinous stuff. The operation became a *post-mortem* examination, and 24 pints of this jelly-like material was removed; the liver, stomach, caecum, and uterus all presented great gelatinous nodules, which showed through the collapsed abdominal wall in a most remarkable manner.

Breast and Uterine Cancer.—I have only removed four mammae in Travancore, in all cases clearing the axilla, and in one case removing the whole of the pectorals also.

One supravaginal hysterectomy died fourteen days after operation.

This gives a mortality of 1.6 per cent. for the 190 cases of malignant disease operated on.

Our section cutting is done on a Cathcart's microtome, with which Bengue's ethyl chloride is used, as the ordinary ether will not work in this climate, and most of our medical students manage it quite skilfully.

Chronic dyspepsia and dilatation of the stomach are amongst the commonest ailments of Travancore. The diet of the inhabitants, like that of most Indians, has a large excess of carbohydrate, and custom, I imagine, has taught them that, to meet the proteid demand, huge quantities of rice must be taken. The ill effects of this large bulk are increased by the fact that they usually take only two huge meals in the day, and in many cases only one.

Buccal Cancer in Travancore.

Nature of the Growth.—It almost always begins in the lowest point of the reflection of the mucous membrane of the cheek on to the lower jaw, just where the quid of chewed betel rests in the majority of Travancore mouths. In the earliest stage there is a sensation of tenderness, more marked on the eating of hot curries. Objectively the mucous membrane shows increased redness, and the teeth in the majority of cases are either decayed or covered with a black deposit, or in some patients, who are more careless and dirty, coated with a calcareous deposit at the spot where they emerge from the gums, and in the fissures between the teeth. Treatment is seldom sought at this stage, though stopping the betel, a simple mouth wash, and a saline stomach mixture, is effectual. Later on the subjective symptoms are usually decreased sensation, though the part may still be hypersensitive and a pale colour, a step towards a leucoplakic condition. I find a mouth wash (recommended first I forget by whom) of a drachm of salicylic acid combined with 2 drachms of borax in 10 oz. of water, together with abstention from betel, and the saline stomach mixture most speedy in effecting a cure here. Then comes the thickened white epithelial stage, creeping up the cheek on the one side, or the jaw on the other. Vigorous scraping with a sharp spoon, when the whole mucous membrane peels off in strips, followed by the treatment of the previous stage, often cures, but by no means always, and such cases are frequently back in a few months, more advanced for further treatment. All these cases salivate excessively, but all betel chewers do that. Up to this there is no detectable gland involvement. At this stage the growth seems to develop in one of two directions: (1) The more rapid ulcerative and soft form, which either spreads up the cheek, rapidly involving the skin, which, becoming fixed, then glazed and oedematous, soon gives way, a foul fungating mass presenting; or the growth runs up the jaw to the sockets of the teeth, which quickly become loose, down on the inner side of the bone and on to the floor of the mouth, the jaw becoming a soft fungating mass; or both sites may become involved simultaneously. This kind of growth is characterized from the beginning by a most foul smell; the submaxillary lymph glands are early and extensively involved, while the salivary gland is usually found free, even in the late stages. This soft ulcerating form also tends to keep more to the front, leaving the commissure.

¹ BRITISH MEDICAL JOURNAL, 1908, i, p. 1357.

² BRITISH MEDICAL JOURNAL, August 3rd, 1907.

and articulation of the jaw free, and does not produce marked swelling. Such a patient is generally dead under the year. (2) The growth following the earlier stage may be of a *hard, infiltrating type*, which produces no ulceration until very late, and even then of a much less irregular, fungating and malodorous type than the preceding. The swelling is marked, either because the growth is in the cheek and when gripped between the fingers suggests a fibrous tumour or early gummatous mass, the skin looks healthy, and the mucous membrane even may only show the thickened white character, or the swelling is marked because the jaw has become the seat of a similar growth and is pushing out the healthy normal cheek. This form usually grows backwards, tends to involve the articulation, and early limits considerably the movements of the jaw, or even entirely prevents the separation of the teeth. Glands are more slowly involved, and by no means so extensively as in the former type.

Treatment depends on the stage of the growth. It is the treatment of malignant disease on general principles, with perhaps a few variations. For example, in early cheek growth, where the skin is not involved, it makes a pretty little operation to turn a flap of healthy skin and subcutaneous tissue up and down from the angle of the mouth, definitely feel the edges of the malignant growth with a finger inside the mouth and the thumb outside, and finally run round the involved mucous membrane with a knife or scissors, and remove the mass now held in position only by the mucous membrane; no throat sponging is necessary; a continuous suture with a friar's balsam dressing or Michel's clamps closes the wound and arrests haemorrhage. Such cases seldom recur; the submaxillary triangle is of course also cleared. I had much more recurrence when I used to try and remove these from inside, owing to the bleeding preventing clear vision of suspicious mucous membrane. In advanced cases I have learned not to dread the fungating and alarming-looking growths to the front, so much as the less dreadful-looking, hard, dry swellings reaching up to the lobule of the ear, and involving the articulation, and I am now very chary of advising operation when I find the commissure at all involved, for the internal maxillary is sometimes divided where involved in the growth, and gives one a nasty couple of minutes, and the cutting off of the involved styloid process, scraping the glenoid fossa almost up to the jugular foramen, and working forward to the foramen spinosum, is not satisfactory.

The Connexion of Betel Chewing with Cancer of the Mouth.

In Travancore, and I imagine in most parts of Southern India, the habit is almost universal, and indulged in from childhood. The materials used are areca nut, betel leaf, slaked lime, and tobacco leaf.

The *areca nut* is the fruit of a palm tree, and the kernel, which is the part used, is about the size of a small almond, though more oval in shape. It has a pungent odour if fresh, an astringent taste, and contains starch, sugar, proteids, a large amount of fibrous material, and some astringent substance.

The *betel leaf* is the ovate leaf of a creeper, bright green in colour, and when chewed alone causes marked salivation, and a temporary sensation of numbness after a hot feeling.

The *lime* is usually prepared by burning seashells, though sometimes from stones.

The *tobacco leaves* are prepared with us (though not so everywhere, I understand) by a prolonged soaking in a saturated solution of a sugary substance known as "jaggery," which is prepared from the juice of the fruit stalk of the Palmyra palm.

The method of chewing in Travancore is usually to take a few bits of areca nut, and placing them in the mouth to chew for half a minute, and then, smearing the betel leaf with slaked lime, to add that. This is said to produce a pleasant sweet taste, and the increased saliva becomes bright red in colour; some swallow this, others spit it out. In about five minutes a portion of the prepared tobacco leaf is added, and the whole is chewed into a bolus, and located in the sulcus between the cheek and the lower jaw. Some keep it there for about a quarter of an hour until it has no taste, and then eject it, while others keep it in for a long time, even up to six hours. If the proportion of lime be increased, there is marked burning sensation and local anaesthesia lasting for several hours. If the tobacco be increased, there are all the symptoms of nicotine poisoning. Many men with their betel can work hard all day without any food.

SUMMARY.

1. The younger age incidence of cancer in Travancore is suggestive of some definite cause early in life.
2. Frequency of cancer of the buccal cavity and absence of it in the rest of the alimentary canal is suggestive of a local cause for the former, but absence of digestive causes in the latter.
3. The inveterate habit of "betel chewing" from childhood is suggestive of the cause, either by mechanical irritation or a medium suitable for the growth of a possible cancer germ.

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A CASE OF POST-ANAESTHETIC ACETONURIA, WITH DELAYED EXCRETION OF ACETONE, AFTER CHILD LABOUR.

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THE signs and symptoms in the following case appear to be very similar to those occurring in the cases of post-anaesthetic acetonuria with delayed chloroform poisoning recorded by Beesly.¹ The treatment which he advocated was followed.

The case is that of a primipara, aged 28, with a previous history of occasional attacks of dyspepsia and constipation, and no previous chloroform anaesthesia. A year ago an examination of the liver revealed the upper border to be at the fifth rib in the mammary line, the lower border two fingerbreadths' distance below the costal margin in the same line.

The pregnancy was uneventful; on three occasions the urine showed an average result of specific gravity 1015, acid, no albumen, sugar, nor casts.

The labour proved to be protracted and abnormal, owing to the premature rupture of the membranes, and escape of the liquor amnii, during the early part of the first stage (approximately of thirty hours' duration). The bladder and rectum were carefully attended to throughout the labour. During the second stage (from Saturday, 10 p.m., to Sunday, May 3rd, 1.30 a.m.) slight chloroform anaesthesia, starting at 11 p.m., was maintained during the pains. Eventually the child was delivered by forceps, the perineum being torn; the tear did not extend into the rectum.

The third stage lasted for an hour and a half. The placenta, which was entirely adherent, had to be removed by the gloved hand under chloroform; a hot douche was then given, and ergotin $\frac{1}{32}$ grain injected hypodermically into the buttock.

The condition of the patient proving satisfactory, full anaesthesia was again maintained and the perineum repaired. Five and a half ounces of chloroform were used, given on a Schimmelbusch mask, which allows of free evaporation.

The periods of anaesthesia during the second and third stages and subsequently, gave an approximate total of four hours.

On Sunday, May 3rd, at 9 a.m., the patient had slept almost continuously from the time when chloroform was withheld; the uterus was well contracted; the pulse was 90, and the temperature 99° F.

The urine was drawn off by catheter. It was of a dark amber colour, with a pungent aromatic odour.

The patient took nourishment well during the day; she complained of slight headache and drowsiness in the evening. Fifteen ounces of urine were obtained by catheter.

On May 4th, after a fair night, she said she "felt well and ready for food." At 9 a.m. the pulse was 100 and the temperature 99° F. There was slight general jaundice, most marked on the malar prominences and the sides of the nose. The skin was dry. The liver dullness was found on percussion to be unchanged.

The uterus was well contracted, the lochial discharge not offensive, and the perineal wound healthy. The lochial discharges and perineal wound progressed to a favourable issue, and no septic changes were noted at any time.

Fourteen ounces of urine were obtained by catheter (after this it was passed naturally); colour, dark amber; specific gravity 1026; highly acid, no albumen nor sugar; no casts were found, but uric acid crystals and amorphous urates.

At 3 p.m. she was restless and drowsy, complaining of hiccough, thirst, frontal headache, and nausea, though there was no vomiting. Pulse 105, temperature 99.4° F., respirations 30. Calomel gr. v was ordered—gr. j every hour.

By 10 p.m. her expression was anxious. She could not sleep; the hiccough was relieved by 3j of champagne every hour. She frequently asked for drink, but only took nourishment after persuasion. Pulse, 110; temperature, 99.4°; respirations, 34. She passed so restless a night that the nurse tied her thighs together to protect the perineal stitches.